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# From Three Possible Iron-Age World-Systems to a Single Afro-Eurasian World-System

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THE world-system perspective was originally conceived by I. Wallerstein in 1974 to apply to the modern period. However, many researchers have tried to use it for more ancient times, often introducing some modifications to its concept (Schneider 1977; Ekholm and Friedman 1982; Rowlands, Larsen, and Kristiansen 1987; Kohl 1987; Edens and Kohl 1993; Algaze 1993, 2001; Frank 1993; Frank and Gills 1993; A. Sherratt 1994a, 1994b; Kristiansen 1998; Chase-Dunn and Hall 1997; Ekholm Friedman 2000, 2005; Gills and Thompson 2006; Kristiansen and Larsson 2005; Beaujard 2005, 2009, 2010a, 2010b, 2010c). Following a world-system approach that takes into account all the interactions between global, regional, and local levels, I proposed geographic and temporal delimitations for possible Bronze Age world-systems in western and eastern Asia in the fourth, third, and second millennia (Beaujard 2010a).<sup>1</sup> For the late Bronze Age, one can acknowledge the existence of a multicentered Western world-system encompassing the Mediterranean basin, Egypt, and western Asia. Under the combined effects of population movements—partly triggered by climate deterioration—and internal conflicts within societies,<sup>2</sup> this system collapsed around 1200 B.C., abruptly breaking the

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<sup>1</sup> I follow the general definition of a system proposed by Morin (1990: 244).

<sup>2</sup> “All the cores imploded, not merely those affected by invasions” (Ekholm-Friedman 2005: 73): it is clear that breakdowns were part of a systemic process.

long-distance networks set up during the period 1600–1200. A long period of unrest then started, in which extreme political fragmentation seemed to prevail. The “black hole” (not so “black” anymore in the actual state of research) that went from 1200 to the early first millennium B.C. corresponds to a period of transformation—a period that should perhaps be shortened, judging by the short chronological proposals of some authors. In the eastern Mediterranean, the demise of the centralized Bronze Age states allowed the rise of political entities and groups who were previously semiperipheral, primarily Cyprus in the twelfth century, and then the Phoenician city-states in the eleventh (S. Sherratt 2003).<sup>3</sup> After this period, ancient and new cores rose again. Bringing to light how the observed trajectories linked up, the main developments starting in the eleventh century B.C. enable us to grasp the change during the first millennium from almost generalized chaos to the constitution of the first world-system that encompassed Asia, Europe, and part of Africa.

In the present article, I intend to show that the Iron Age (end of the second millennium through the first millennium B.C.) represents a crucial period of change, where one can see the evolution from three possible world-systems to a single one, with the progressive integration of Old World regions.

Iron metallurgy came about around the mid second millennium. After 1200 and in the first millennium B.C., it spread both eastward and westward from western Asia.<sup>4</sup> In the latter case, its expansion “marked the continuation of the transfer of centres of equilibrium towards the Mediterranean” (Margueron and Pfirsich 2001: 314).<sup>5</sup> The rise of this

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<sup>3</sup> For S. Sherratt (2003: 42), Cyprus not only took advantage of the demise of the large states, it also contributed to it, at least in the case of the Mycenaean state.

<sup>4</sup> According to A. Sherratt and S. Sherratt (2001: 31), the island of Cyprus was an active center in the development of iron metallurgy, turning to its advantage the know-how of its bronze-working craftsmen and the demand for iron (in Egypt, Tutankhamon was buried with both a gold dagger and an iron one). Further in space and time, Anatolia and then the Levant were centers of expansion for this iron metallurgy.

<sup>5</sup> In Sub-Saharan Africa, it seems that iron work was established around the sixth or fifth century B.C. in the Senegal River Valley, Nigeria, Cameroon, and Niger, as well as in the region of the Great Lakes (Woodhouse 1998; Bocoum 2002; Childs and Herbert 2005: 280–281). There is still some controversy about the origin of iron metallurgy south of the Sahara desert (was it an African invention or had it spread from Egypt or the North African coasts?). Ironwork could be found in Upper Nubia in the eighth century B.C. Copper metallurgy is attested on a site west of Agades in Niger circa 800 B.C. and some time later in Akjoujt, Mauritania (in this case the Phoenicians may have played a part in spreading this technique). The question of possible contacts between the Phoenician colonies and Sub-Saharan populations has been discussed for a long time, as well as an ancient gold extraction

metallurgy testifies to the rapid breakdown of old networks of exchange (of copper and tin) and the setting up of new connections.<sup>6</sup> The price of iron certainly played a role in its expansion; apparently, it was clearly lower than that of copper in the mid first millennium (Haarer 2001: 264–265; Warburton 2003: 254).<sup>7</sup> The manufacture of tools and weapons played a crucial part in the developments observed from 1000 B.C. on, yet the spread of iron might not be due to its superiority: Moorey (1994: 278–292) has underlined that iron weapons were often no better than bronze weapons, even in Neo-Babylonian times. The establishment of an “Iron Age” did not mean the end of bronze tools and weapons, and therefore of tin and copper exchanges. Among other innovations of that time, the introduction of dromedaries in Africa—probably by southern Arabs—enabled the development of exchange networks on that continent.<sup>8</sup> In the east of western Asia, starting in the tenth century B.C., a growing aridity contributed to the emergence of nomadic shepherds riding horses (with bit and harness).<sup>9</sup> Yet the climate factor is but one of the reasons behind it: this innovation also originated in increasing exchanges and transformations amongst the societies of the steppes. Populations from Central Asia were partly responsible for the spread of iron metallurgy to India and China at the end of the second and the beginning of the first millenniums B.C. Pastoral nomads would play an important role in the restructuring of

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in western Sudan (Herodotus wrote about “silent barter” practiced by the Carthaginians to obtain gold, on the Atlantic Moroccan coast). “The ‘chariot route’ of Central Sahara, coming from Fezzan, already arrived somewhere near the site of Gao around 500 B.C.” (Coquery-Vidrovitch 1993: 127).

<sup>6</sup> In contradistinction to this view, S. Sherratt considers “the gradual adoption of utilitarian uses for iron as the result of economic processes already underway in the 13th century”: increased quantity of bronze in the eastern Mediterranean in this century would have induced a relative “devaluation” of this metal, and a symbolic valorization of iron (2003: 40, 44).

<sup>7</sup> According to Warburton, there was a reversal of prices between copper and iron in the early first millennium. For Warburton, “the success of iron cannot be attributed to any obvious technical superiority” (2003: 254). Yet the use of iron plows in China and South Asia, and the development of the crossbow in China seem to contradict this assertion.

<sup>8</sup> Remains of dromedaries dating from the first part of the first millennium B.C. were found in Qasr Ibrim, southern Egypt (Rowley-Conwy 1988, 1991). From Egypt, dromedaries reached the Sahara. This was mentioned in inner Africa in the first century B.C. (in Roman writings from circa 45 B.C.; MacDonald 2000: 13).

<sup>9</sup> Horseback riding already existed in earlier times—for leading herds and sending messengers, for example on the Assyrian caravan roads toward Kanesh (Anatolia) and in the BMAC culture; figurines representing horse riders dating back to the early second millennium were excavated in Pirak (Baluchistan). Yet it seems that horse riding did not appear in the framework of armed action until the first millennium B.C.—which corresponds to a transformation of societies (Renfrew 2002: 5–6).

the world-systems, signifying the importance of semiperipheries<sup>10</sup> and peripheries in the evolution of the systems.

In both the Western and the Chinese hypothesized world-systems, we can observe three cycles in the first millennium B.C. (see Table 1), partly initiated by climatic variations—with lower temperatures

TABLE 1. Cycles in the Iron Age world-systems

Successive cycles in the Western world-system

Phases of growth	Phases of recession
1000–850	850–750
750–450	450–350
350–200	200–1

Successive cycles in the Indian world-system

Northern India	
Phases of growth	Phases of recession and restructuring
700–200?	200–1?
Southern India	
Phases of growth	Phases of recession
200–1	

Cycle of a possible Western Asian-Indian world-system

Phases of growth	Phases of recession
350–200	200–1

Successive cycles in the Chinese world-system

Phases of growth	Phases of recession
1000–850	850–750/700
750/700–450	450–350/300
350/300–50	50–1

<sup>10</sup> The semiperipheries are intermediaries between cores and (generally) dominated areas. On the importance of the semiperipheries, cf. Arrighi (1994: 23) and Chase-Dunn and Hall (1997: 28). As Chase-Dunn and Hall (2009) expressed it, “the exact boundaries between the core, semiperiphery, and periphery are unimportant because the main point is that there is a continuum of economic and political/military power that constitutes the core-periphery hierarchy.”

around 850 and 200 B.C. These can be seen as part of a systemic logic (as is shown in Fig. 1). The periods of recession were marked by more or less intense movements of populations, by pressures of (semi-)nomadic groups on sedentary societies, and by tensions within these societies. In 2005–2006, Frank and Thompson established their analysis of that period on stronger theoretical bases than Frank had done in 1993,<sup>11</sup> reviewing observable trends for a number of large regions, in periods of about fifty years (Frank and Thompson 2005: 146–147, Table 9.3).<sup>12</sup> Taking over this attempt and adding Central Asia and western Arabia to it, I have reached results that are often similar yet sometimes different from those of the authors mentioned (see Table 2).<sup>13</sup>

WESTERN AND EASTERN WORLD-SYSTEMS:  
THE FIRST CONNECTIONS (1000–750 B.C.)

The climate amelioration in China and western Asia, as well as the growth of the monsoon in the Indian Ocean in the early first millennium, contributed to the improvement of farming production.<sup>14</sup> The period 1000–850 represented a time of global growth within a Western world-system that had—partly—been rebuilt.<sup>15</sup> In the tenth century, four poles emerged in Egypt, the Levant, Assyria, and Anatolia,

<sup>11</sup> Taken up by Bosworth (1995), the comparison between the evolution in the number and size of towns and the expansion and contraction phases put forward by Frank and Gills (1993) shows a number of differences and probably the inherent difficulties of this approach. Furthermore, it should be noted that, unfortunately, Chandler's (1987) estimations on the large cities of the world jump from 200 B.C. to 100 A.D.:

Phases of growth (Frank and Gills)	Support by Chandler	Phases of decline (Frank and Gills)	Support by Chandler
1000–800	Strong	800–550	Contradictory
550–450/400	Strong	450–350	Weak
350–250/200	Strong	250/200–100/50	Weak/inconclusive
50/100–200	Strong	200/250–500	Strong

<sup>12</sup> One can regret that the limited space of the article did not enable the authors to structure in a more precise fashion the abundant bibliography and the global results put forward.

<sup>13</sup> Divergences probably come from a different understanding of sources whose interpretation is difficult. Briant (1996) thus noted, referring to the Persian Empire, how we are often dependent on extremely biased Greek sources; it seems that there are not enough documents for such periods as the reign of Artaxerxes II. For the Hellenistic Levant, Sartre (2001) has emphasized the incomplete and contradictory documentation.

<sup>14</sup> Moreover, in Oman and southern Iran, we note agricultural progress based on the qanat irrigation system (Magee 2005).

<sup>15</sup> Frank and Thompson (2006) envisage—wrongly in my opinion—a generalized recession between 1000 and 750, writing: "For the 9th century, contraction persisted in

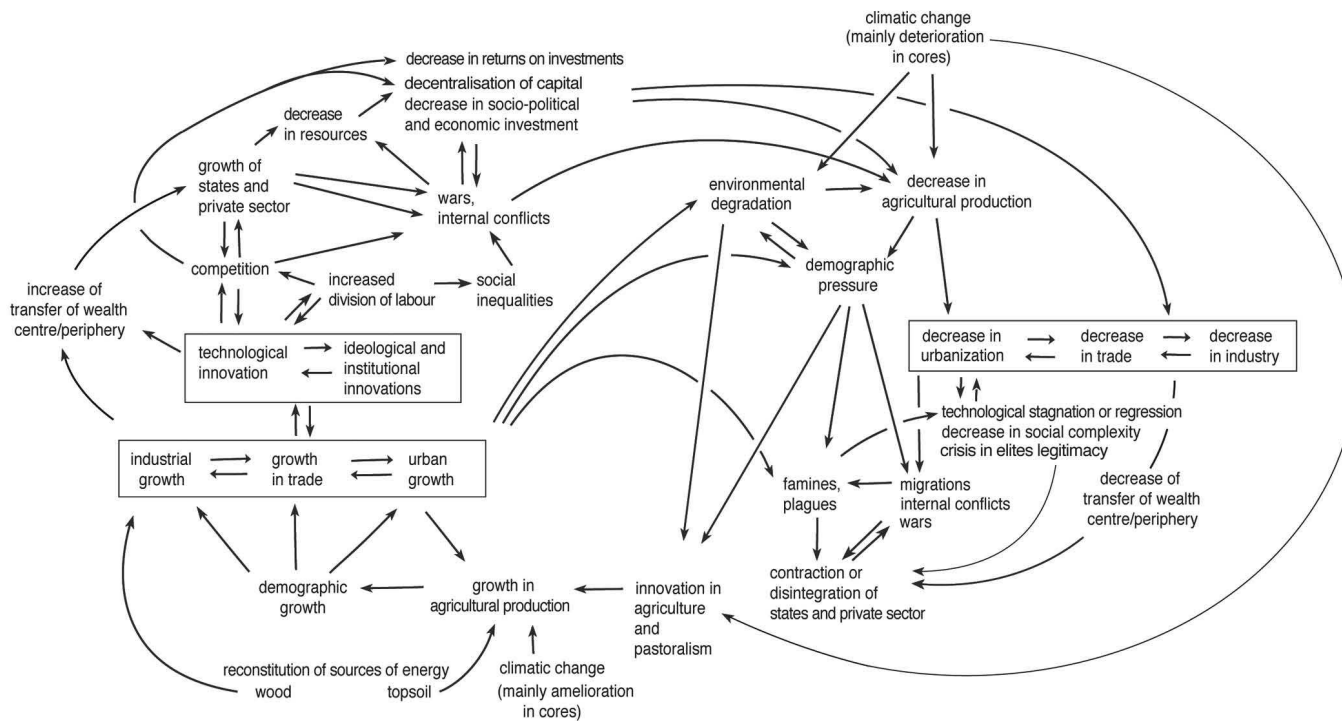


FIGURE 1. Cyclical logic in world-systems

TABLE 2. Economic growth and recession in different regions of Africa and Eurasia

	Egypt	Israel Palestine	Syria Lebanon	W. Arabia	Anatolia	Greece	N. Africa	Italy	N. Meso- potamia	S. Meso- potamia	Iran	W. Central Asia	N. India	S. India	Conti- nental S.E. Asia	N. China	S. China
1000–900	+	+	+	+	?	+		–	?	–						+	?
900–850	+	+	+	+	M	+		+	+	+						+	?
850–800	–	+	+	+	+	–		–	–	–		–				–	?
800–750	–	+	+	+	+	–		+	–	–		–				–	–
750–700	–	–	+	+	M	+	+	+	+	–	+	+				M	–
700–650	–	–	–?	+	–	+	+	+	+	–	M		+			+	+
650–600	+	+?	M	+	–	+	+	+	–	+	+	+	+			+	+
600–550	+	–	–	–	+	+	+	+	+	+	M	+	+			+	+
550–500	+	+?	+	+	+	+	+	+	+	+	+	+	+			+	+
500–450	–	+	+	+	+	+	+	–	+	+	+	+	+			+	+
450–400	–	–	+	+	–	M	+	–	+	+	+		+			+	–
400–350	M	–	M	M	+	–	+	–	–	–?	–		+	+	+	M	+
350–300	M	M	M	M	+	+	+	+	+	+	+	+	+	+	+	+	–
300–250	+	+	+	+	M	M	–	+	+	+	+	+	+	+	+	+	+
250–200	+	M	M	+	M	M	+	–	+	+	+	+	+	+	+	+	+
200–150	–	–	–	–	M	–	+	+	–	M	+?	M	M	+	+	+	+
150–100	–	–	–	–	M	–	–	M	–	M	–	–	M	+	+	+	+
100–50	–	–	–	–	M	–	–	M	+	+	M?	+	–?	+	+	+	+
50–1	M	M	M	+	+	–	M	+	+	+	+	+	–?	+	+	–	+

+ growth

– recession

M intermediate situation

? undetermined situation



between which new connections were tied. The Assyrian kingdom expanded in the ninth century, when it took control of Anatolian metal resources. A Mediterranean space was reshaped, spreading from the western Mediterranean to the Black Sea in the eighth century. The Phoenician—and especially Tyrian—expansion had started before, as early as the tenth century. A significant phenomenon, the culture of the Garamantes (Libya), combining irrigated farming and long-distance trade, started to emerge in 900 B.C., as an interface between the Mediterranean and Inner Africa (Pelling 2005). A sign of contacts with the Levant, the southern Arab alphabet took shape as early as the eleventh or tenth century B.C., stemming from a “Proto-Arabic” alphabetic linear script from Jordan and Palestine (Lemaire 2007: 58–59). The development of alphabets provided the basis for transforming the relationships between the individual and the authority.<sup>16</sup> The alliance between Israel and the king of Tyre allowed the rise of joint trade in the Red Sea (cf. the expeditions toward Ophir), an attempt to bypass both the Arab caravan trade and Egyptian control of the gold supply (Aubet 2001: 45). Decline did not start in Egypt until the death of Osorkon in 850. In 853, divided though it was, Egypt was still able to send mercenaries, allies of the Hebrews, to Syria; they helped stop the advance of the Assyrians at the battle of Qarqar. The participation of Arab camel riders in this battle bears witness to the successful trade that already united Arabia and Syria at that time (Kitchen 1994: 117).<sup>17</sup>

In East Asia, the Zhou’s loosely centralized state can be viewed as the core of a world-system in which diverse influences mixed, coming from the steppes, Sichuan,<sup>18</sup> and regions south of the Yangze. The introduction of iron technology, probably originating from Ferghana, took place as early as the late second millennium B.C. in Xinjiang. It was adopted in the central plains in the early first millennium. Influences from cultures of the steppes<sup>19</sup> are noticeable in Mongolia and

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most regions” with Egypt remaining in recess until about 700, and Anatolia until 750. More rightly, Frank (1993) had put forward a period of growth of the “central world system” between 1000 and 800.

<sup>16</sup> While the complexity of ancient writings befitted their limited number of usages and users, the simplicity and efficacy of alphabet writings transformed not only their social function but the relationship between individuals and the various spheres of power.

<sup>17</sup> A federation of Qedarite Arab leaders was set up in the first half of the first millennium B.C.

<sup>18</sup> Succeeding to Sanxingdui, the site of Jinsha was probably the capital of an early Shu state (Qing and Fang 2003).

<sup>19</sup> The Karasuk culture (ca. 1200–800 B.C., recently dated to 1400–850 through C<sup>14</sup> datings), and then Scythian culture from 800 B.C.

China, for example, with the presence of decorative craft goods with “animal style” designs. The presence of Iranian “magi” at the court of the Zhou in the beginning of the first millennium shows the connection of China with Central Asia and Iran,<sup>20</sup> yet this connection was not sufficient to bring together into a single system both the Eastern and the Western space.

In North India, a sphere of interaction centered on the Ganges Valley took place, as a prelude to the birth of a new world-system.<sup>21</sup> It benefited from the progress of agriculture, as a result of the use of iron tools, which induced a growth of population. Iron also enabled the making of more effective weapons.<sup>22</sup> In parallel to this metallurgy, glass manufacturing developed.

Between 850 and 750 B.C., climate cooling played a part in the recession and population movements noted at that time.<sup>23</sup> This climatic change was marked by growing aridity in some regions and greater humidity in parts of the steppes (the regions of Tuva and Minusinsk, eastern Siberia, the north of the Black Sea, and the west of the Urals) (Koryakova and Epimakhov 2007: 10–11). According to some authors, it could have contributed to the growth of the “Scythian” population and its expansion (van Geel et al. 2004). The latter should be understood within the framework of a general expansion of the system. Attracted by the riches of other countries, the various nomadic populations were probably eager to take by force what they could not get

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<sup>20</sup> According to Mallory and Mair (2000: 326), Iranian “magi” might already have been present at the Shang court at the end of the second millennium. The Cherchen tombs, on the southern branch of the Silk Road, dated circa 1000 B.C., contained “mummies” of Caucasoid type. A man wore trousers, an invention linked to horse riding (the Chinese adopted trousers as well as horse riding ca. 400 B.C.). Hats of a “Phrygian” type (Cherchen) or tall and pointed (Subeshi, east of Turfan, ca. fifth century B.C.) have been found, which reflect Iranian influences.

<sup>21</sup> I speak of spheres of interaction when exchanges within an area do not produce a significant transregional division of labor (unlike a world-system).

<sup>22</sup> Iron metallurgy may have been introduced in India at the end of the second millennium B.C. following fresh immigrations or contact with new populations. Authors such as Chakrabarti (1992: 171), however, argue for an independent origin of iron metallurgy in India. Agrawal and Kharakwal (2003) remain cautious with this hypothesis.

<sup>23</sup> This period corresponded to a peak in the production of C<sup>14</sup> (Kromer, Korfmann, and Jablonka [2003: 52–53] have established a correlation between a high rate of C<sup>14</sup>, weak solar activity, and climate cooling); Bond et al. (1997) note a cold peak at that time in the North Atlantic. Liu, Xu, and Cui (2002) emphasize the stronger aridization of Inner Mongolia starting in 900 B.C., with climate cooling. Wang et al. (2005) consider that monsoon weakening took place around 800 B.C. The decrease of rainfall was notable in the region of Vancouver at that time (Zhang and Hebda 2005). The Netherlands experienced a wet and cold climate between 850 and 750 B.C. (Dark 2006). The Mediterranean probably suffered from a more arid climate during that period of weak solar activity.

through exchange. In China, attacks from the steppes forced the Zhou into changing their capital city and led to the weakening of their state. Farther west, a series of movements in Central Asia brought about the migration of the “Cimmerians” who had settled north of the Black Sea. Anatolia suffered their invasions in the late eighth century and the early seventh century. These invasions also concerned Eastern and Central Europe, starting in 800 B.C. (Harding 1994: 334; Kristiansen 1998: 193).<sup>24</sup> Iranian-speaking people penetrated into India at that time as well. The second half of the ninth century was a period of withdrawal, perceptible in Assyria and more so in Egypt, which was affected by the weakening of the monsoon in the Indian Ocean.

#### THE DEVELOPMENT OF THREE OVERLAPPING WORLD-SYSTEMS (750–350/300 B.C.)

##### *The Western World-System from the Eighth to the Sixth Century*

In the Mediterranean, however, the Ionian League took shape as early as the end of the ninth century, showing a development of the Aegean world in connection with trade with the Levant (siting a possible Phoenician settlement at Thebes at the beginning of the first millennium B.C., Bernal [1991: 6] advocated a Phoenician influence on the Greek world since the tenth century B.C.). Nevertheless, a phase of growth and integration of the Western world-system—in this, I agree with Frank and Thompson (2006)—became perceptible only in the second part of the eighth century. It was marked by a new rise of the Assyrian empire (starting during the reign of Tiglath-Pileser III, 745–727), by Phoenician and Greek expansions in the Mediterranean and the Black Sea, and by the constitution of the Saba kingdom in Yemen. The latter exerted strong influence on the pre-Aksumite kingdom of Daamat (central Eritrea and western Tigrinya), which came about around 700 B.C. The renewed growth of networks and states was furthered by crucial technological and institutional innovations: a new development of iron metallurgy, agricultural progress, the diffusion of alphabets (in the new states of the Levant and in the Aegean Sea). The construction of the Assyrian empire was accompanied by major innovations with the creation of a new capital city and the organization of provinces,

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<sup>24</sup> Western influences are also noticeable: cf. the appearance of chin straps on the deceased in the Tarim basin from circa 800 B.C. (Müller 2003).

other regions being vassalized. It was marked by a double movement, “Assyrianizing” conquered lands and “Arameanizing” the core (Beaulieu 2005). Assyria was the first state to maintain a permanent army. The authorities practiced massive deportations of populations; at the same time, they adopted the Aramean language as a lingua franca and the Aramean script for their administration. The institutional innovations of the Assyrian empire explain how it was able to grow “to a size unheard of in previous times.” Interestingly, innovations in the Assyrian empire were often borrowings from Syria and the Levant (Allen 2005). The centralization of the empire and the emergence of a class of administrators and soldiers did not prevent the upsurge of a private sector. Various documents show the existence of prices set by the interplay between supply and demand (Silver 2004: 66). Through increased political pressure and its demand for luxury goods and metals, exchanged as well as extorted (in the shape of tributes), Assyria contributed to the expansion of the Phoenician networks from 800 B.C. onward in the West, where capital accumulation in towns such as Carthage and Gadir escaped from Assyrian control (Aubet 2001: 278; Allen 2005: 85). Phoenician towns introduced a geographical division of labor, where Sidon and Tyre, and later Carthage, played a prominent role. Tunisia and Sicily delivered grain, Sardinia provided silver and lead, Spain supplied silver and copper. The main metallic demand was silver, which was the standard money in the Assyrian empire. The establishment of Gadir, close to the Iberian kingdom of Tartessos, which provided silver in considerable quantities,<sup>25</sup> played an especially important part. Iberian silver partly financed the expansion of that network, and firstly that of Tyre and Assyria. The cities on the Phoenician coast developed craft industries partly turned toward export, with an intensification of labor. They made purple dye from murexes, and exported textiles along with luxury craft items (worked ivory, furniture, glass, etc.).<sup>26</sup> One can note that various monetary forms

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<sup>25</sup> The blossoming of this kingdom is a good example of co-evolution originating with the contact of an economically and ideologically dominating power. Such was also the case with the Scythian kingdoms or the “Celtic” political entities of the *oppida* period (cf. *infra*).

<sup>26</sup> The example of the Phoenician city-states, as well as that of Greek cities, refutes Weber’s idea that ancient cities had no significant production for export and did not invest their revenues into production. Weber contrasted these ancient cities with medieval European towns. The development of industries intended for export, notably textile industries, could already be seen in the Egyptian and Mesopotamian states of the third and second millennia.

based on weighed silver were used: sealed bags of standard weight (precursors of Lydian currency); “pre-portioned” metal bars such as those found in Troy, Cyprus, Zinjirli (Turkey), Eretria (Greece), and Nûsh-i Jân (Iran); spiralled rings (sometimes of one mina weight); and oval pieces of silver “often of predetermined size” (C. M. Thompson 2003). Beyond the western Mediterranean, Phoenician networks extended as far as the Atlantic coasts of Morocco and the Iberian Peninsula, where gold from western Sudan and tin from Cornwall both arrived. On the scale of the system, one must consider the Levantine space as a core despite the political domination of Assyria over the Phoenician cities, which induced a flow of riches toward Ninive.

Greek cities also benefited from the expansion of the world-system, setting up a series of trading posts in Sicily and in the western Mediterranean during the eighth and seventh centuries. The Greek towns of the Ionian coast established trading posts in the Black Sea as well. Growing exchanges with inland Europe led to integrating a part of Central Europe into the world-system: the “Hallstatt culture” exported metals, skins, salt, slaves, and horses, with Etruria playing the role of interface with the Greek trading posts (A. Sherratt and S. Sherratt 1993; Kristiansen 1998). Further on, amber roads were connected with Italy.

The expansion of the Western world-system went on until the seventh century (Kristiansen 1998: 133).<sup>27</sup> Nevertheless, until approximately 660, Egypt remained in a phase of withdrawal. The capture of Egypt by the Assyrians in 671 and then in 664 was the first time an Asian power had attempted to incorporate the granary that the Nile valley represented. It symbolizes the volition of the Assyrians to control both space and men between the Indian Ocean and the Mediterranean, and it reveals a new phase of integration within the Western world-system. The regained independency of Egypt in the twenty-sixth dynasty (664–525) was accompanied by increasing Greek influence—both on a commercial and on a military level—and by an expansion toward the Levant and the south at the expense of the Kushite kingdom. The Assyrian expansion furthermore led to the crystallization of the Mede confederation, which would play a part in the fall of Assyria by allying itself with Babylon.

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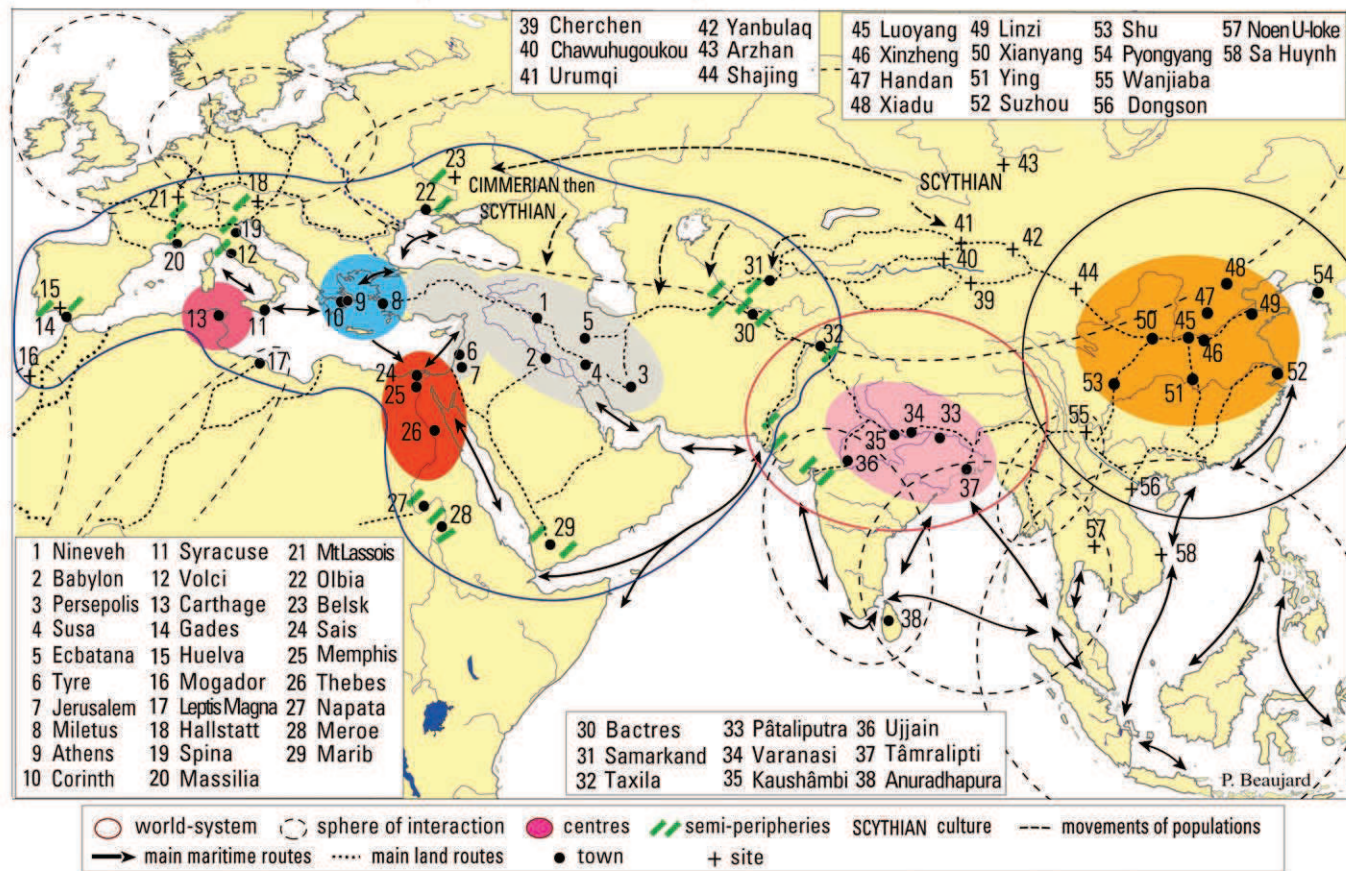
<sup>27</sup> A climatic amelioration in western Asia may have played a role in this growth: From 700 B.C., data from the Van Lake show a relative increase in precipitations (Wick, Lemcke, and Sturm 2003).

*The Constitution of an Indian World-System in the Seventh Century*

Starting in 700 B.C., we see the parallel developments of no longer two but three world-systems with increasing interconnections in the following centuries. Indeed, cities emerged and states were formed in India and northwest of India, in the central plains of the Ganges and in Gandhara, Afghanistan (Kamboja), Madhya Pradesh (region of Ujjain), Maharashtra (region of Paithan), Saurashtra, and Bengal. According to ancient Buddhist and Jainist sources, there were sixteen major states in the late seventh century B.C., with Magadha emerging as the most powerful one in the sixth century, partly due to its control of iron resources. An Indian world-system whose core was the Ganges Valley and the region of Ujjain was then in place. It was connected to western Asia by land routes crossing Bactriana, Margiana, and northern Iran. Furthermore, sea routes via the Persian Gulf grew in importance. We know that an Assyrian navy was formed in the seventh century with the help of the Phoenicians. Moreover, the development of connections with China, via the Yunnan, could date back to that period, although on routes that were already known in the second millennium B.C. (Higham 2004: 57). The Dian culture, in Yunnan, which appeared before the middle of the first millennium B.C., bears influences from Shang and Zhou China, which were transmitted via Sichuan (Falkenhausen 2003: 217).

*The Eastern World-System*

In China, the political fragmentation characterizing the period known as Spring-and-Autumn (771–481) went along with the development of the craft industry and exchange. A transformation of the state began at that time, marked by the invention of fiduciary currency (in all the states of the Yellow River), the introduction of administrative districts (state of Chu), and the first forms of agrarian tax systems (states of Lu and Zheng). Between the seventh and fifth centuries, the rise of the state of Chu, on the Yangze River, promoted exchanges with southern countries, signaling an enlargement of the Chinese world-system. The emergence of a glass industry (for bead making, the fabrication of *bi* discs) and the findings of imported glass reveal increased connections with Central Asia via what would develop into the Silk Roads (cf. the soda-lime glass beads found in Shanxi dated to the beginning of the fifth century) and also via a Yunnan-Burma-India route, a route attested by the findings of beads from the West in Chu tombs. Artistic designs of various ornaments observed between Central Asia and China also



MAP 1. Afro-Eurasian world-systems from 750 to 350 B.C.

show the importance of these interactions (Wu Xiaolong 2004). Such interactions are further revealed by the introduction of the peach tree in the Mediterranean in the seventh century B.C. (Zohary and Hopf 2000: 182).

*The Restructuring of the Western World-System circa 600 B.C.*

In the mid seventh century, nomadic raids affected the Chinese states. Around the same time, movements of people coming from the Asian steppes brought about important changes in the Western world-system. The Scythian invasions did not affect the whole system, yet they led to other restructurations. They induced the disappearance of the Urartu kingdom and the decline of Assyria, which was also struck by an internal crisis. This opened the way to a transfer of power toward southern Mesopotamia in the late seventh century.<sup>28</sup> The Babylonian empire that was being set up took over from the Assyrian empire with the same intentions, yet it did not reach the scale of its predecessor. In a favorable economic period, Egypt drew back before the Babylonians in the Levant, yet prevented the invasion of the Nile delta. In the south, taking Napata in 590, it gained access to the Nubian gold mines.<sup>29</sup> The Egyptian expansion continued—with increasing implication from the Greeks—until the Persian invasion in 525. The early sixth century was a turning point for the balance of power in the Mediterranean. Babylon's control over Phoenician cities led to the weakening of the Levantine coast; starting in 604, it was subjected to no less than eight Babylonian military campaigns, directed against Egypt. The decline of this coast brought about the emancipation of Carthage, and globally contributed to the Greek expansion (Kristiansen 1998: 126).

*The Key Period of the Sixth Century*

Exchanges accelerated throughout Eurasia in the sixth century B.C., a period of generalized economic development and urbanization marked by the increasing power of Persia, China, and India, and the rise of

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<sup>28</sup> Scythian migrations also affected Eastern Europe. Scythian mercenaries probably entered the service of princes in the Hallstatt culture (Kristiansen 1998: 287). It is possible that Scythian movements played a part in the transfer of trade routes toward the western area of the Hallstatt culture. The new populations that settled north of the Black Sea soon established profitable contacts with the Mediterranean world (cf. *infra*).

<sup>29</sup> Moreover, Napata was situated at the crossing of roads leading to the African inland. The antiquity of a route linking Nubia and the Tchad lake has to be considered; this route was probably used as early as the period of the New Egyptian kingdom.



Carthage and the Greek cities in the Mediterranean. Everywhere, one notes "a change of scale in the interconnections" (Harding 1994: 334).<sup>30</sup> As was already observed for the Bronze Age, the cores of the various world-systems (western Asia–Egypt–the Mediterranean area, northern India, China) exported textiles and manufactured products (metal items, glass, etc.) and imported raw or semimanufactured goods and slaves from more or less distant peripheries. Between both ends of the exchange chain, semiperipheries blossomed, taking advantage of the dynamics of the system (at least, their elites benefited from it).

With the exception of the Levant, Palestine, and Susiana, which were victims of Babylonian imperialism, the sixth century clearly appears as a period of expansion of the Western world-system. Such was the case in the Mediterranean, as well as in the Persian Gulf, where it seems that trade was developing when the Achaemenid empire took shape (550 B.C.).<sup>31</sup> The setting up of this empire opening onto three seas signified a new phase of integration of the Western world-system. To the west of this empire, the development of Greece, largely based on the use of servile manpower, gave rise to the establishment of trade networks with Central and Eastern Europe. This trade powerfully contributed to the structuring of European semiperipheries and peripheries, and to the geographical enlargement of these peripheries. The Etruscan upsurge toward the Po valley and the creation of Massilia by Phocian Greeks led to a strengthening of exchanges with northern Europe, via the Swiss Alps and the Rhone Valley. In the western Hallstatt culture,<sup>32</sup> these exchanges triggered or spurred the emergence of *chefferies* working in interface with peripheral regions farther north, which notably supplied slaves, amber from the Baltic Sea, and probably furs (Kristiansen 1998: 141). The same coevolution process led to the formation of Scythian kingdoms north of the Black Sea, with urbaniza-

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<sup>30</sup> Chase-Dunn and Hall (1997: 219) note "a synchrony of changes in city-size distributions and phases of urban growth/decline" for eastern and western Asia since about 550 B.C. However, it is dubious that the Eastern and the Western world-systems were already unified at this time.

<sup>31</sup> Strangely, Frank had put forward a phase of recession between 800 and 550 B.C. As was the case with the period 1750–1600, Frank suggested the idea that the withdrawal of the "core" (Mesopotamia) was accompanied by a rise of the "periphery" (the Mediterranean). For a critical review of Frank's periodization, cf. Kristiansen (1993: 415), Muhly (1993: 418), and A. Sherratt and S. Sherratt (1993: 418).

<sup>32</sup> I have already pointed out the possibility that the Scythian expansion in Eastern Europe (as far as Hungary, Moravia, and Silesia) played a part in the transfer of trade routes toward the western zone of the Hallstatt culture.

tion starting in the sixth century. Scythian cities massively provided the Greek world with slaves; they also exported horses and gold.

Exchange also grew between the Greek world and Egypt, which was in full revival under the twenty-sixth Saitic dynasty (663–525 B.C.). The exchanges were regulated via the Greek trading post of Naukratis. Greek and Lydian mercenaries joined the Egyptian army. Egypt and the Levant also traded with Arabia, which acted as a hinge between Asia and Africa thanks to the development of both seafaring and caravans between Yemen and Gaza, and between western and eastern Arabia. Moreover, Darius had dug a canal between the Nile and the Red Sea (Herodotus, *Histories* II.158), partly to bypass the Arab confederation of Qedar, which controlled the caravan routes to and from the Hijaz (Lemaire 1987: 55, 56).

To the east of this Western world-system, India also experienced spectacular growth. An urbanization movement is clearly perceptible in the Ganges Valley and in central India of the sixth century. Trade blossomed in inner India and toward more distant regions. These evolutions were probably encouraged by the rise of Darius's empire, as it controlled Gandhara and Sind, through which Persian and Babylonian influences entered northern India. The expansion of the Magadha kingdom took place precisely at the time of the Persian conquest of northwestern India, and writing developed from systems used in the Achaemenid empire. The kingdom of Gandhara, with the town of Takshasila (Taxila), testifies to the activity of roads leading toward Central Asia and Iran. In the sixth century B.C., the importance of trade and the development of competing states explain the introduction of currencies issued by merchants and kingdoms in the Ganges Valley and in Taxila,<sup>33</sup> and of a standardized weight system. The coasts of India were also involved in long-distance exchanges. Greek and Biblical texts mentioned herbs and spices that came from southern Arabia and also from India and, farther on, Southeast Asia and even China. Various Indian writings noted shipping trade between Babylon and India in the seventh and sixth centuries B.C., trade that probably involved Dravidians, Aryans, Persians, and Arabs. In Mesopotamia arrived steatite

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<sup>33</sup> Seventeen states issued silver currencies between the sixth century B.C. and the Mauryan period, in Bengal (coins featuring the image of a ship), Kalinga, the Ganges Valley, Gandhara, the Avanti Kingdom (Ujjain, Madhya Pradesh), the Konkan coast (west of India), the region of Junagadh (Saurashtra), and that of Paithan (Maharashtra; Chakrabarti 2000: 383). Copper coins were also issued. They bore no inscription but had marks on the metal. In India, it is possible that the oldest ones were issued by guilds.

and copper from Oman, and wood, precious stones, beads, spices, and aromatics from India (Salles 1996: 256), along with iron and steel. The Apadana bas-reliefs at Persepolis also show us Indians bringing cotton. Moreover, caravans transporting incense would go through Arabia to Gerrha (Thaj), but incense and Indian myrrh also came from India, with other aromatics. A cinnamon flower had been discovered recently in the Heraion of Samos (Amigues 2005: 374). The presence of cowries in Punic graves indicates connections between the Mediterranean Sea and the Indian Ocean, via Egypt and the Levant.<sup>34</sup>

One can wonder whether the florescence of such towns as Samarkand, Balkh (Bactra), and Taxila around the seventh through sixth centuries, and the advance of the Persian Empire toward Central Asia and the Indus—which can be explained by the vitality of exchanges in these regions—is not a sign that a system was taking shape, uniting the spheres of western Asia–Egypt–the Mediterranean and northwest India. Going further, Gills and Frank (1991: 68) have suggested that the sixth and fifth centuries B.C. were the period when eastern Asia interconnected with western Asia, enabling the formation of a world-system that encompassed the whole Eurasian space and part of Africa. Curiously, stamped or cast coins appeared in Lydia, the Ionian cities,<sup>35</sup> India, and China at the same time in the sixth century B.C. Their issue corresponds to crucial social changes, with the rise of competing states and a growth in trade. Merchants probably took the Central Asian roads between China and India. Chinese silk reached India. On the other hand, and contrary to what has generally been assumed, the findings of silk in Kerameikos (Greece) and Hochmichele (Germany) do not correlate with the introduction of Chinese silk in Europe, but rather to the development of craft using “wild silk” from European lepidoptera (Good 2009). Likewise, the cashmere wool fabric fragments discovered in Lattara, near Montpellier (dating from 470–460 B.C.), could have originated from a race of Pyrenean goat, and they are not necessarily an indication of contacts between Europe and Central Asian networks (Amigues 2005: 362; Good 2009). It is striking, however, that pieces of artillery—a kind of crossbow—were used by Ancient Greeks, for exam-

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<sup>34</sup> The fact that there were contacts with Sub-Saharan Africa raises the question whether the first cowries might not have arrived in West Africa at that time (Hogendorn and Johnson 1986: 15).

<sup>35</sup> Coinage was the extension of the use of seals, possibly known as early as the beginning of the second millennium. These seals were affixed by the palace, temples, and merchants on bags of set weight, which contained pieces of guaranteed pure metal (C. M. Thompson 2003: 78–83).

ple, at the battle of Syracuse in 397 B.C. Hero from Alexandria has left the description of a crossbow, a weapon invented by the Chinese in the fourth century B.C. at the latest. Needham favors the idea of an introduction of this weapon from China (in the West, the crossbow fell into oblivion, but reappeared in the tenth century). Even though the mobility of Central Asian nomadic populations contributed to—and took advantage of—exchanges, it seems premature to consider eastern and western Asia as united within a single system. While it is true that there was an interconnection of the different spheres of eastern Asia, India, and western Asia in the sixth and fifth centuries B.C., it seems that these connections were neither regular nor intense enough to be systemic. For that period, it is difficult to highlight a synchronous evolution and a true interdependence of the various regions, as would appear some time later.<sup>36</sup> The growth perceived in China starting in 700 B.C. with the Spring-and-Autumn period (722–481) was due to internal phenomena in eastern Asia rather than to connections established with western and southern Asia.

The sixth and fifth century period is crucial to world history, for the technical and institutional innovations that were introduced in the realms of politics, religion, and economy. It is crucial again for the transformations in the social field. The area governed by the Achaemenids did not merely take over from the Assyrian and Babylonian empires; with its size and its institutional innovations, it was the first “universal empire.” The organization of the Satrapies, for example, shows the innovative vision of Achaemenid Persia. In China, a state transformation began, a prelude to the more radical changes of the following period of the Warring States. As an outcome of parallel political and social evolutions, money—as I already mentioned—appeared in Lydia and China in the shape of coins guaranteed by the state. From China to the Mediterranean, social changes induced a new way of thinking about the universe and society, which went alongside the emergence of the individual. It resulted in the forming of great philosophical and religious doctrines (Jainism and mainly Buddhism in India, Confucianism in China, Mazdeism in Persia<sup>37</sup>) as models aiming to be universal. In the Greek world, it resulted in the flowering of rationalist

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<sup>36</sup> Cf. also Christian 2000: 16. According to Chase-Dunn et al. (2006: 115), “there was a synchrony between East and West Asia as of ca. 500 B.C.”

<sup>37</sup> Zoroastra is generally thought to have lived around 600 B.C. (Mallory and Mair 2000).

humanism,<sup>38</sup> democratic institutions<sup>39</sup> and new technologies. It also resulted in the appearance of rationalist trends in China (Mohism) and some time later in India—with the *Arthasāstra*, partly written in the fourth century B.C. (Mittal 2004),<sup>40</sup> which placed the research of profit above all other aims in life (Glover 2000: 95). These transformations were probably the sign of a higher level of integration of the Eurasian space (Frank 1993: 399). The newly found place of the individual was inseparable from the ongoing economic evolutions. Babylonia and the Persian Empire saw the appearance of “capitalist” firms such as the Egibi “house,” often working with the state. Phoenician cities knew the expansion of entrepreneurship with an interpenetration of the state and private sectors.

However, in the Western world-system it was mainly the Greek world that contributed the most revolutionary innovations. There, the emergence of markets (Bresson [2000] uses the term *économie à marché*, but Migeotte [2007: 150] prefers *économie à marchés*) was connected to that of freedom of thought. This resulted in a questioning about the world, the government of the city, and even the laws of the gods. Greek towns borrowed the alphabet from Phoenician ports, as well as institutional principles and “perhaps the very idea of *polis*” (Niemeyer 2000: 109),<sup>41</sup> and yet they invented a new concept, that of citizenship. We know however that political power at Tyr and Carthage was controlled by a council of notables, the suffets, who were elected each year (Aubet 2001: 117), and that Carthage was organized into an oligarchic republic from the fifth century B.C. The Carthage organization probably influenced the Roman republic, which was ruled by two consuls. The developing trade, in connection with production adapted to specific

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<sup>38</sup> Starting in the seventh century, the Miletus school developed forms of rationalism. One notes the emergence of religious skepticism amongst certain thinkers, such as Xenophanes of Colophon (who might have died around 470 B.C.). Most people remained attached to cults, which proliferated and were privatized, becoming “the property of families that exploited them as they would have enterprises” (Moore and Lewis 1999: 155).

<sup>39</sup> Nevertheless, as Hansen (2000a: 165–166, 2000b: 599) rightly emphasizes, it would be wrong to consider the Greek *polis* as a democratic state. “Some cities were democracies, others were oligarchies or monarchies.” Furthermore, the system was based on a massive use of slavery.

<sup>40</sup> Other authors consider that this work is a compilation from the third century A.D.

<sup>41</sup> To the Phoenician alphabet, the Greeks added signs of vowel notation. According to Hansen (2000a: 147), “the emergence of the *polis* in the colonies influenced the formation of the *polis*” in Greece and Asia Minor. It is probable that such ancient sites as Lefkandi, in Euboea (1000–700 B.C.), were not *poleis*. For Morris (1987: 196), the Greek *polis*, however, came from internal processes where “internal class conflict was at the root of change: the peasant population rebelled against their aristocratic lords” (Kristiansen 1998: 141).

markets, was based on the activity of individual merchants rather than firms and/or merchant-princes linked to the state and temple. The fact that Aristotle expressed his apprehension of an “extension of the merchant sphere dissolving traditional social relations” and criticized the “art of acquiring goods” within an ideology of profit precisely reflects the advance of the merchant sphere. Available data indicate the emergence of markets and payment by wages, even though slavery remained an essential feature of economy (Norel 2004: 102, 105). One can note the emergence of a kind of economic rationality, still limited by institutional constraints (their importance is yet difficult to assess). (Maucourant [2008] proposes the concept of “limited rationality.”) This emergence is evident as early as the second millennium B.C. but more so in the Roman period.<sup>42</sup> Taking up the Mesopotamian innovation of the second millennium, Greek bankers issued credit notes, which merchants could cash in another town. However, deposit banks making use of the money entrusted to them was a Greek innovation.<sup>43</sup> The contribution of Syrian and Phoenician trade practices to the Greek world, which did not have the same public institutions as Mesopotamia—that is, the ability to regulate the system by granting debt cancellations<sup>44</sup>—dramatically resulted in extreme social polarization. Slavery for debts developed, an oligarchy of big landowners came about, and inequalities grew in parallel with the increasing monetization of economy (Hudson 2002). The new polarization of society explains the emergence of reformers in Athens, Sparta, and Corinth (Hudson 1996, 2004). It

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<sup>42</sup> Relying on the archives of a large private estate in the Fayum, Rathbone (1991) shows the emergence of economic rationality. Sombart (1926: 273) has already emphasized that “search for profit and economic rationality were developed in works from Xenophon and some Roman writers” such as Columella. Weber thought that there was a kind of “ancient capitalism” in Roman times (1906 [1998]), but this capitalism, in contrast to the medieval one, depended on the political sphere and remained “irrational,” using techniques that limited its development (cf. Capogrossi 2004; Bruhns 2004). The Roman capitalists took advantage of the links they established with the politico-military elites, profiting from privileges in the collection of taxes, from the attribution of domains, and from the demand in luxury goods and in products for the troops, who in turn provided slaves.

<sup>43</sup> However, Silver (2004: 72) underlines that the verb *qāpu* means both “to lend” and “to deposit” (CAD Q/A 3–4 95–7 s.v. *qāpu*). In Egypt, at the beginning of the first millennium, the scribe Any wrote: “If wealth is placed where it bears interest, it comes back to you redoubled” (Silver 1995: 115).

<sup>44</sup> However, debt cancellations are no longer attested to in Mesopotamia in the first millennium B.C. We only have a few examples of tax remission for a limited amount of time, such as those granted by the usurper Bardiya in the Persian Empire (Jursa 2002). On the other hand, the idea of a collective absolution entered Judaic laws in the “Jubilee Year” (Hudson 1996: 35). It should be noted that interest rates in Greece followed the decimal system: the *dekate* represented 10 percent per year.

made it necessary for armies to call upon mercenaries more and more often. The richness of the private sector rose at the expense of the state sector: Contrary to what could be observed in ancient periods in Western Asia, “the major creditors were no longer public institutions but private individuals” (Hudson 2002: 38).

The transformations of the Greek world went along with the transformation and extension of long-distance exchange networks. Large properties turned toward olive tree fields and vineyards rather than the production of grain, hence there was a growing need to import wheat. They used dependent manpower, as did industries and silver mines. The slave trade developed considerably, coming from the Danube valley but also from western Asia and “Scythia” (from the Scythian capital Gelonus [Belsk] to the Greek colony of Olbia, Ukraine) into the Greek space. This trade, which would continue in Roman times (Taylor 2001: 34), largely contributed to the structuring of European peripheries and the geographical enlargement of these peripheries. The first millennium B.C. was probably the first period in history marked by massive population transfers—mercenaries and manpower—from margins and peripheric regions to central regions. Starting in the sixth century, one can observe a growing militarization of the people of the steppes, owing to both the development of slave trade in the west and the Achaemenid expansion in the east. Moreover, Greek markets knew some of the products of the Indian Ocean trade. Indian beads were known in the fifth century B.C., and pepper arrived at Athens in the fourth century B.C.—both black pepper *Piper nigrum* L. and long pepper *P. longum* L. (Amigues 2005: 371).

The recently developed intensity of exchanges in the sixth and fifth centuries B.C. may explain the appearance of new diseases, such as that which decimated the Athenian army in 430–429 and hit Persia (McNeill 1998: 120).<sup>45</sup> The Bible emphasizes the frequency of epidemics during certain periods in the first millennium B.C.

### *The Eastern World-System in the “Warring States” Period*

In China, after the political fragmentation of the Spring-and-Autumn period came a phase of reconcentration starting in the second half of the fifth century B.C., during the Warring States. As was the case with Greek city-states and as would be the case much later in Europe (in the sixteenth century A.D.), the competition between these king-

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<sup>45</sup> The disease could have originated in Upper Egypt.

doms contributed to institutional innovations, with state transformations influenced by the current of thought of the legists. True administrations were set up, shoving aside former aristocracies. Competition also encouraged technical innovations, development of thought, and global economic progress, yet with a slight downward trend in northern China between 400 and 350, during the phase of climatic deterioration already mentioned for western Asia. The Wu and Chu states were the first—in the fifth century B.C.—to develop a large cast-iron metallurgy, inducing progress in agriculture and in the military sector. The introduction of the iron plow around that time could have resulted from contacts with India via the Yunnan; it seems that the use of drawing oxen spread out in parallel with iron metallurgy (A. Sherratt 2006). A steel manufacturing process goes back to that period, as does the invention of the crossbow. The devising of effective harnesses for horses is another important innovation of that time. Exchanges increased with Central and southern Asia, on the roads of Tarim and Sichuan, and more northern routes (Christian 2000; Wu Xiaolong 2004). A good example of the formation of a secondary state is that of Shu in Sichuan, in the fifth century, as an interface between several areas. It reveals the growing importance of the trade routes that connected this region to the Yangze, the Yellow River, and Southeast Asia. Furthermore, the richness of the graves in the region of Lake Dian as of the fifth century B.C. shows the existence of routes connecting China and South Asia via Yunnan. Contacts with Southeast Asia multiplied, on both land routes—toward the Pearl River—and sea routes.

*The Expansion of the Indian World-System from the Sixth to the Fourth Century B.C.*

In India, while the core of the world-system was located in the Ganges Valley and central India, land and sea networks spread out. The findings of shards with Brāhmī letters in Anuradhapura, in levels dated between 510 and 340 B.C., is evidence that Sri Lanka was connected with northern India (Ray 2003: 114 n. 4).<sup>46</sup> The expansion of Buddhist networks went along with the development of internal and external trade, notably in the direction of Southeast Asia. A system of exchanges via the Bay of Bengal was set up as early as the mid first mil-

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<sup>46</sup> Carnelian etched beads were discovered in an Iron Age “megalithic” cemetery, in the northern plain of Ceylon (Ibbankatuwa; dated between the seventh and fourth centuries B.C.; Coningham 2002: 104).



lennium B.C. There were probably Indians in Southeast Asia as of the fourth century B.C. (site of Ban Don Ta Phet; Glover 2000).<sup>47</sup> Pepper was traded, since the term \*amrec (coming from the Sanskrit) is reconstructed in Proto-Chamic. In India, we can note that the *Arthasāstra* mentions aloes wood using a word of Malay origin. Moreover, the north of Vietnam and the lower valley of the Mekong clearly show signs of exchanges with China at the time of the Warring States (Higham 1996: 114, 211; 2002: 173). In continental and insular Southeast Asia, the emergence of iron metallurgy coming from both China and India attests to the expansion of land and sea routes and to the progressive formation of a global Asian space. The development of this metallurgy and the “explosion of exchanges” in the Malacca and Java Sea Straits between 500 and 200 B.C. brought about the development of complex societies (Wisseman Christie 1995: 251). These societies were also the outcome of internal evolutions partly based on the increase of wet rice cultivation. The introduction (from India?) of plow and animal traction, however, allowed new agricultural growth, which went alongside centralization of power and social stratification (as observed earlier in western Asia, cf. A. Sherratt 2006).

*The Recession of the End of the Fifth and the Beginning of the Fourth Century B.C.*

The expansion of the Western world-system remained notable in the early fifth century,<sup>48</sup> with the exception of Egypt. Yet this world-system as a whole entered a recessionary period in the second half of the fifth century, for systemic reasons, partly linked to a climatic change observable between 450 and 350 B.C. A gradual decline in Greece took place at that time, with a loss of trade competitiveness and a process of decentralization in the accumulation of capital (Friedman 2000, 2005). There was an increase of military activities in the steppes, both west and east of the Oural, which was affected by growing aridity. Soon, in the fourth and third centuries (Koryakova and Epimakhov 2007: 243–244), increased use was made of armored cavalry. In Western and Central Europe, the weakening of exchanges brought about social unrest and the collapse of the western Hallstatt ensemble, while the

<sup>47</sup> Bellina favors a date of third or second century B.C. for the most ancient levels of the site of Ban Don Ta Phet (Bellina and Glover 2004: 84 n. 20).

<sup>48</sup> This period is marked by the Persian defeats in their attempts to invade Greece, in 490, 480, and 479 B.C., at Marathon, Salamis, Plataea, and Mycale.

peripheries—Champagne, the Rhine and Moselle region, and Bohemia (La Tene culture)—started an expansion partly fueled by internal processes, with the emergence of new war elites (Cunliffe 1994: 358; Kristiansen 1998: 291–293, 321). It is customary to talk of “Celtic” migrations for the cultural movements and expansion that affected the whole of Europe from the beginning of the fifth to the third century B.C. As early as the end of the fifth century, “Celts” settled in the Po Valley and advanced into the Middle Danube Valley. In 390, they reached Rome, which was partly pillaged and burnt down. Also in the fourth century, Celtic armies led raids in Illyria, and at the beginning of the third they led attacks into Bulgaria. However, these movements were blocked farther south by the Macedonian power.<sup>49</sup>

The beginning of the fourth century was also a period of relative withdrawal for northern China, due to changes in the balance of powers between the northern and southern Warring States on the one hand, and attacks or migrations coming from the steppes on the other. The sphere of South China and Southeast Asia probably experienced growing interactions in this period. Relying on a Chinese text of the fourth century B.C., Needham put forward the possibility of Yue expeditions toward the Indian Ocean.<sup>50</sup> The Yue sailors must have been in contact at least with Southeast Asia, even if the archaeological evidence for these contacts remains scarce.<sup>51</sup>

#### GROWING INTERACTIONS BETWEEN THE THREE WORLD-SYSTEMS (CA. 350–1 B.C.)

##### *Toward the Unification of the Indian and Western World-Systems?*

Part of the population of the Greek city-states immigrated to the Mediterranean as well as to Macedonia, the seat of the empire of Alexander, who took possession of the Achaemenid space in 333 (Friedman

<sup>49</sup> On the other hand, Celtic attacks took place around 280. In 279, Celts led a raid in Greece and pillaged Delphi. Celts went through Asia Minor and settled in Phrygia. Furthermore, Celtic warriors went to Egypt where they placed themselves in the service of Ptolemy II.

<sup>50</sup> The text mentions that “the sailors of the Yue region have been absent from the western regions for years” (Needham 1970: 140).

<sup>51</sup> Potassium glass beads found at Dong Son (North Vietnam), Giong Ca Vo (South Vietnam, dated between the fourth and the second century B.C.), Ban Wang Hi (Thailand), and at Gilimanuk (Bali), and Ulu Leang (Sulawesi; beginning of the Christian era) could have a Chinese origin, even if this point remains in debate (Dussubieux 2001: 212–215).

2000: 142; 2005). The phase of general recession lasted throughout the first half of the fourth century.<sup>52</sup> Then, at the end of that century the trend returned to growth, within a system whose cores were Egypt and Mesopotamia—Greece by then was no more than a semiperiphery, at least in the third century. The Hellenistic period was paralleled by an increasing monetization of economy in Ptolemaic Egypt and the Seleucid empire. Farther west, Carthage and Rome started to fight for the control of the western Mediterranean. Trade networks continued to develop in inner Africa, as is reflected in the new development of the Garamantes culture (Pelling 2005).<sup>53</sup> As observed in China from the fifth century on, the arms race proved to be a stimulus for technical research in the Hellenistic Mediterranean, and this also benefited agriculture. War machines were invented or perfected at that time, as well as various hydraulic devices, automata using cam systems, trains of gears, endless screws, and pulleys.<sup>54</sup> The water wheel appeared in the Mediterranean in the second century B.C., yet it is unclear whether it was a Hellenistic invention or a borrowing from the Chinese world via Persia. To the south of Egypt, the flowering of the Kingdom of Meroe shows that new regions of Africa were incorporated into the system; it also reflects the trading connections of the Horn of Africa with South Arabia and the Indian Ocean.

The ends of the fourth and the third centuries B.C. were also periods of growth in India and Central Asia. Established in Magadha, Chandragupta, the first Mauryan sovereign, started to build an empire in 322, just after Alexander the Great's retreat from the Indus Valley. Under Ashoka, this empire spread southward beyond the Kistna River. It enabled the expansion of both Buddhism and trade, especially toward Southeast Asia. The development of a Greco-Bactrian kingdom around 250 B.C. also demonstrates the vitality of the roads in Central Asia. A hub between India and western Asia, it was also—although to a lesser extent—connected with northern China, then in full mutation. Exchange grew between India and Mesopotamia, helped by the

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<sup>52</sup> While the "revolt of the Satraps" was but localized riots without connections between one another—contrary to the organized character Greek sources attributed to them (Briant 1996: 675)—it does seem that the Persian empire experienced difficulties during the reign of Artaxerxes II.

<sup>53</sup> The rise of the Garamantes culture went along with regional developments in western Africa, for example in the Niger valley.

<sup>54</sup> Alexandria was famous for its school of mechanics, with Ctesibios (third century B.C.) and Hero (second or first century B.C.), a mathematician and engineer. Furthermore, Alexandria saw the development of abstract mathematics, with Euclid (third century B.C.) as their prominent figure.

active policy of the Seleucids in the Persian Gulf. Following a military clash, there were diplomatic relationships between the Mauryan empire and the Seleucids. Moreover, a royal edict of Ashoka mentions Ptolemy Philadelphus, which shows the existence of contacts between India and Egypt, contacts also attested by Agatharchides, Diodorus, Strabo, then the author of the *Periplus* and Pliny the Elder on the one hand, and in the *Cankam* Tamil literature on the other (Salles 1996; Thapar 1997). Controlled by the Gerrheans, Arab caravan routes leading to Petra and Babylon also played an important role in long-distance trade (Salles 1996: 260–261).

*The Crisis of the Western World-System in the Second Century B.C.*

The second half of the third century, and more so the second century B.C., were a new period of hegemonic transition in the Western world-system, with a decline of the Egyptian and Mesopotamian cores, weakened by their ceaseless wars. This decline was accompanied by increased internal conflicts. The gravity center of the Mediterranean system moved westward, with Rome becoming the prominent power once the Carthaginian threat was eliminated. This can clearly be seen in the victory over the Seleucid emperor Antiochos III in Magnesia in 190, and by Antiochos IV's obedience to the orders of the Roman ambassador Gaius Popilius Laenas, who instructed him to leave Egypt and Cyprus in 168. Soon after (between 144 and 139), the Parthians seized Mesopotamia and Persia, but they themselves experienced Scythian raids in Iran.<sup>55</sup> The Roman state conquered or controlled Spain, southern Gaul, the Dalmatian coast, Greece, western Anatolia, and Cilicia in the second century B.C.; northern Gaul, Syria, Palestine, and Egypt in the first century B.C. The expansion of the Roman world went alongside a growing demand for slaves, iron, and mercenaries. This led to the emergence of *oppida* from southern England to Serbia. These first urban centers north of the Mediterranean show the emergence of political entities that took advantage of their position as intermediaries between Rome and more distant peripheries. After Rome had taken control of Gaul and Central Europe in the first century B.C., these border zones where middlemen became rich expanded farther beyond the Rhine and Danube. Following the collapse of Celtic politico-economic entities, owing to Roman attacks and the expansion

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<sup>55</sup> The Parthians were led by the Arsacids, who were Scythian Dahae from the east side of the Caspian Sea. Here is yet another example of a periphery taking hold of a core.

of the Germans, most *oppida* disappeared in the late first millennium. Conquests enabled Rome to directly exploit resources such as silver in Iberia (forty thousand slaves would work in the mines near Cartagena),<sup>56</sup> copper from Cyprus, wheat from Egypt, wood and wheat from North Africa, and so on.<sup>57</sup> A class of private entrepreneurs developed, in close connection with the expansion of the state. Roman growth went along with a transformation of agrarian structures—large properties making massive use of slavery<sup>58</sup>—and social tensions in the second and first centuries B.C.

With the exception of the burgeoning Roman Empire, the whole of the Western world-system seemed to suffer from a shortage of silver in the second century B.C.<sup>59</sup> This was due to the monopolization of Iberian metal by Rome and to the regression of exchanges in the whole eastern Mediterranean. In the second century B.C., economic recession and the weakening of states were accompanied by growing insecurity on land and sea throughout western Asia: “the whole [eastern] Mediterranean and Pontus Euxinus were infested with pirates and the situation grew worse at the beginning of the first century” (Sartre 2001: 436). In the western Mediterranean, the conflicts led by Rome ended up with the dislocation of the old trade networks, which in turn resulted in a relative decline of exchanges. Relying on the weakening of western Asia and the disappearance of the Mauryan Empire, Gills and Frank (1993: 163) suggested a “B phase” (recession phase) “of the world system between 250/200 and 100/50 B.C.” It is indeed tempting to connect the dislocation of the Mauryan Empire with the weakening of the Seleucids and the restructuration of the Western world-system. Furthermore, climatic changes—also reported in Egypt, with lesser floods of the Nile,

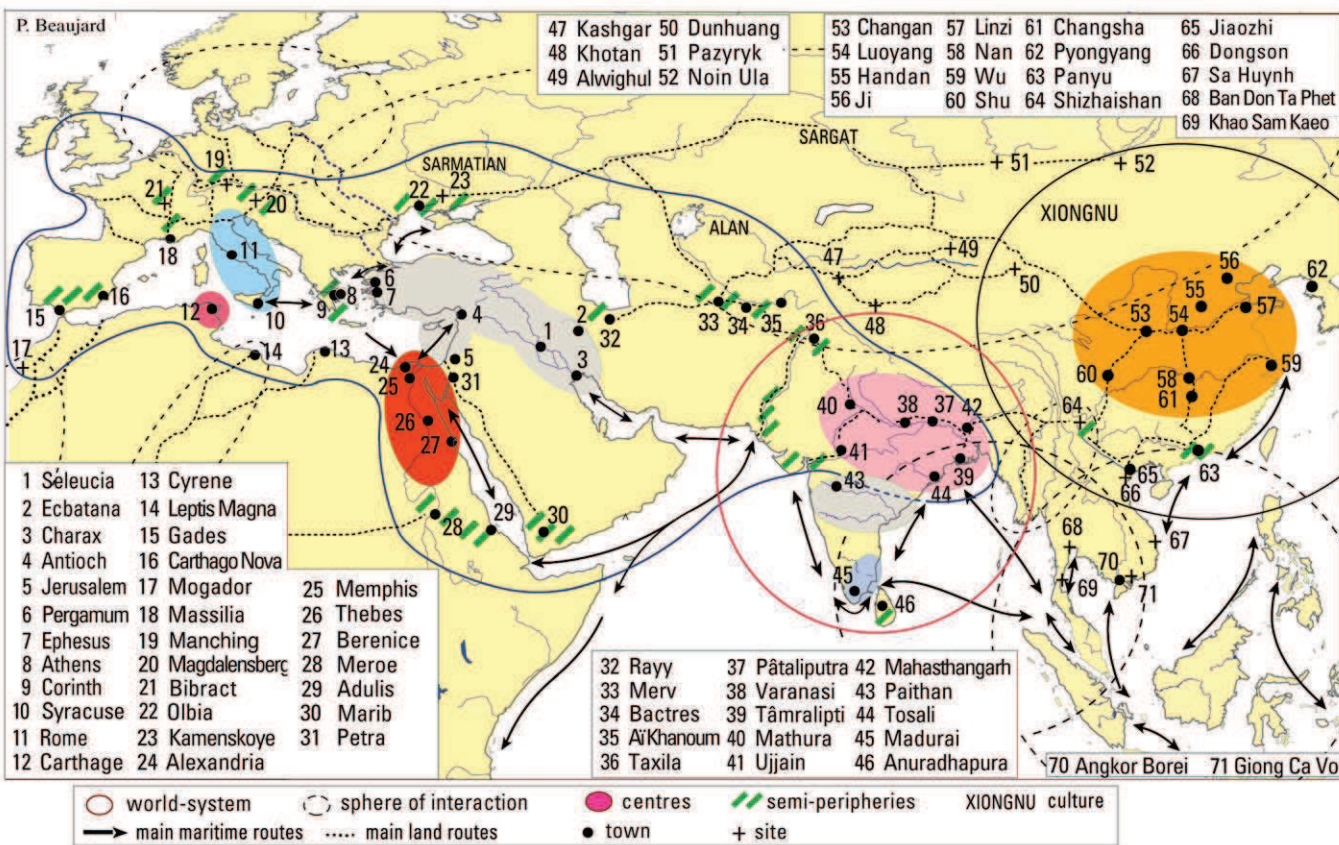
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<sup>56</sup> Gibbon compared the contribution of the Iberian Peninsula to Rome with what Peru and Mexico were for Europe in the sixteenth century (Cunliffe 1994: 370).

<sup>57</sup> As is the case with the Carthaginians in a former period, there remains the question of contacts with Sub-Saharan people. It seems that the Romans obtained ivory and slaves from Sudan, through Garamantes peoples who traded with Tripolitania. These roads must have been used as soon as Carthaginian trading posts were set up in Tripolitania. As early as the first century B.C., Jenne-jeno formed a conurbation with neighboring sites. The emergence of this agglomeration was due foremost to internal development, yet also, in part, to increasing long-distance contacts: some glass beads from the Mediterranean have been collected (Hansen 2000a: 15).

<sup>58</sup> Generally speaking, the number of slaves in the Roman society was a limiting factor for division of labor and innovation.

<sup>59</sup> Nevertheless, for an opposite opinion, cf. Le Rider and de Callatay 2006: 202–206. Yet several sovereigns were led to reduce the weight of their tetradrachma, such as Perseus (Macedon), Eumenes II (Kingdom of Pergamon), and Antiochos IV in the Seleucid empire.



MAP 2. Afro-Eurasian world-systems from 350 B.C. to the end of the first millennium

resulting in food shortage under Ptolemy V—brought about population movements in the whole of Central Asia and then in Afghanistan and northwestern India in the second century B.C. These led to unceasing political changes in these regions in the late first millennium.<sup>60</sup> Starting in the second part of the third century, Sarmatians coming from the north of the Aral Sea took control of Scythian territories north of the Black Sea.<sup>61</sup> The emergence of the Parthian Empire (starting in 171 B.C.) and the political instability in Bactriana-Margiana probably made the India–Red Sea route more attractive than that of the Persian Gulf from the second century B.C. on (W. R. Thompson 2005: 42).<sup>62</sup> These two sea areas had clearly been in competition since the sixth century. Yet, from 209 B.C. onward, the rise of a nomad confederation (Xiongnu) in the eastern steppes was another reason for population movements in Central Asia, notably concerning the Yuezhi tribes.<sup>63</sup> This rise itself was the result of changes that took place in China.

### *The Rise of the Eastern World-System Centered on China*

Frank and Gills rightly note that China was then in expansion, therefore not synchronized with the “B phase” of the Western world-system. The reforms carried out by the legists in the Qin state allowed for the creation of a centralized state endowed with an efficient administration, which increased agricultural production and set up a powerful army. The Qin state managed to get the upper hand over its rivals and to unify China in 221 B.C.; its armies even pushed toward the Pearl River and the Red River, where commanderships were set up. An empire rest-

<sup>60</sup> Schettler et al. (2006: 1055) also note a weakening of the East Asian monsoon around 200 B.C.

<sup>61</sup> According to Koryakova and Epimakhov (2007: 11), Sarmatian movements actually began earlier, during a period of aridization in the steppes that started around 500 B.C.

<sup>62</sup> In 78 B.C., the *epistrategos* of the Thebaid was “responsible” for the control of the Red Sea and the Indian sea (Tarn 1938 [1951]: 369). Parthians, however, maintained trade activities in the Persian Gulf, where they controlled the port of Spasinou Charax. Parthian pottery is found everywhere in the Persian Gulf, but also on the Horn of Africa, at Ras Hafun (Smith and Wright 1988).

<sup>63</sup> From Mongolia, the Xiongnu operated raids on China and—in 176 B.C.—forced the Yuezhi, who initially controlled the Hexi corridor, to migrate westward to the Samarkand region. Through a domino effect, the collision between the Yuezhi and the Saka led to a displacement of the latter, and then of other more Western groups. I have underlined that a steppes route was already active before the formation of the Xiongnu confederation. The findings at Pazyryk (third century B.C.; Altai) are evidence for this route, with tombs containing embroidered silk, bronze mirrors, and fragments of carpets showing Iranian influences.

ing on new political bases built up. The formation of a Xiongnu state in the steppes shows the importance of contacts (commercial and/or military) via what was to be called the Silk Roads as well as a more northern route through the steppes, as is attested to by the richness of the graves belonging to the elites of the Sargat culture (Koryakova and Epimakhov 2007: 311). The establishment of the Han dynasty in 206 B.C. corresponds to a new phase of expansion for unified China, where innovations and major projects encouraged the development of production and trade. One notes the invention of paper, the appearance of iron plows equipped with various types of moldboards, the invention of a multitube seed drill, of a rotary winnowing fan (working with a crank handle or a crank connected to a treadle), the use of various water wheels, and the devising of the driving belt, notably used in the winding machines of the textile industry. Furthermore, a major innovation appeared in the world of the steppes around the end of the first millennium: the stirrup, which was to change the art of war and the capacity of negotiation of the nomadic populations. The Han pushed toward Central, South, and Southeast Asia. The emperor Wudi sent Chinese missions to Central Asia and Parthia. Envoys from Gandhara and the Parthian empire arrived in Han China (Needham et al. 1980: 332). In the first century B.C., the Chinese took control of a corridor going from Mongolia to Turkestan. Horses, jade, furs, metal objects, and silk were notably transported along this corridor. The findings of carnelian etched beads in the Tarim and east of Khotan show the interconnection of Central Asia with networks linked to India.<sup>64</sup> As of 109 B.C., a large part of Yunnan was incorporated into the Chinese state. Rich in precious metals, the region was also a major route toward South Asia. At the time of Emperor Wudi (141–87 B.C.), Chinese emissaries also left toward the South Seas, embarking on *kunlun* ships—this term refers to southern peoples, notably the Austronesians who had probably frequented southern China for a while (Mahdi 1999: 215)<sup>65</sup>—bound for Huangzhi (Kāñcī, on the southeast coast of India). Taking advantage of the growth in exchange, the ships of southeast Asian populations—which at that time benefited from various technical innova-

<sup>64</sup> Etched beads have been found at Baozidong, north of Akesu (Tarim), and on the fortified site of Djoumboulak Koum (dated mid first millennium B.C. for the first levels), situated east of Khotan (Mei and Shell 2002: 218; Debaine-Francfort 2001: 66).

<sup>65</sup> After the fall of the Qin, a Chinese official proclaimed himself king of Nanyue (Guangdong), with Panyue (region of Canton) for his capital. About the Han mission, cf. the *Qianhanshu* (History of the Former Han), written by Ban Gu around 80 A.D. (Wang Gungwu 1958 [1998]: 19–20; Wolters 1967: 33; Needham et al. 1971: 443).



tions—frequented both the Chinese coasts and those of eastern India and Ceylon. We know that cloves from the Moluccas arrived at the Chinese court around the second century B.C. and that the Malay name for this plant entered the Sanskrit language around the first century B.C.<sup>66</sup> It is clear that a large Asian area was set up around that time with China as its core, connected with the Indian and western Asian world-systems through inner Asia and the sea routes.

In the late first millennium B.C., one clearly perceives the creation of exchange networks on a large scale, using both land and sea routes. The Greek and then Roman advance toward the Indian Ocean can be explained by the growing importance of trade in that ocean, especially in the Bay of Bengal.<sup>67</sup> The silk roads acquired new importance. In the two last centuries of the first millennium B.C. (when the Greeks started to use a direct route from Arabia or the Horn of Africa to India), the East Asian networks and those of the western Indian Ocean were more strongly interconnected. This was a movement heralding the formation of a large zone of exchange in the first century A.D.—the first Afro-Eurasian world-system encompassing the whole of Asia.

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The Iron Age of the first millennium B.C. thus globally appears as a period of growth—more pronounced than the Bronze Age—for networks and states, based on major technical and institutional innovations (see Fig. 2). Exchanges were set up on a large scale, by way of land and sea routes.

The systemic paradigm provides a convincing interpretative framework for the data available for this period, even if insufficient quantitative figures do not allow us to determine the level of integration between regions. Table 2, which presents the paths of the main areas of the hypothesized Western world-system, clearly shows that, on the one hand, they did not all progress at the same pace, and on the other hand, that some of them were directly affected (whether positively or negatively) by the expansion of the dominant cores. One can distin-

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<sup>66</sup> The *Rāmāyana* features the first-known mention of cloves under the Sanskrit name *lavanga*, borrowed from the Malay *bunga-lawang*, through Dravidian (Mahdi 1999: 213). Yet the dates when the various parts of the *Rāmāyana* were written remain a question for debate. The Sanskrit word *karpūra*, “camphor,” a substance imported from Sumatra, also derives from the Malay *kapur* meaning “lime.”

<sup>67</sup> It was not the Greek and Roman enterprises that initiated the development of trade in the Indian Ocean, as has been too often said, but indeed the reverse, and especially the flourishing trade between India and East Asia.

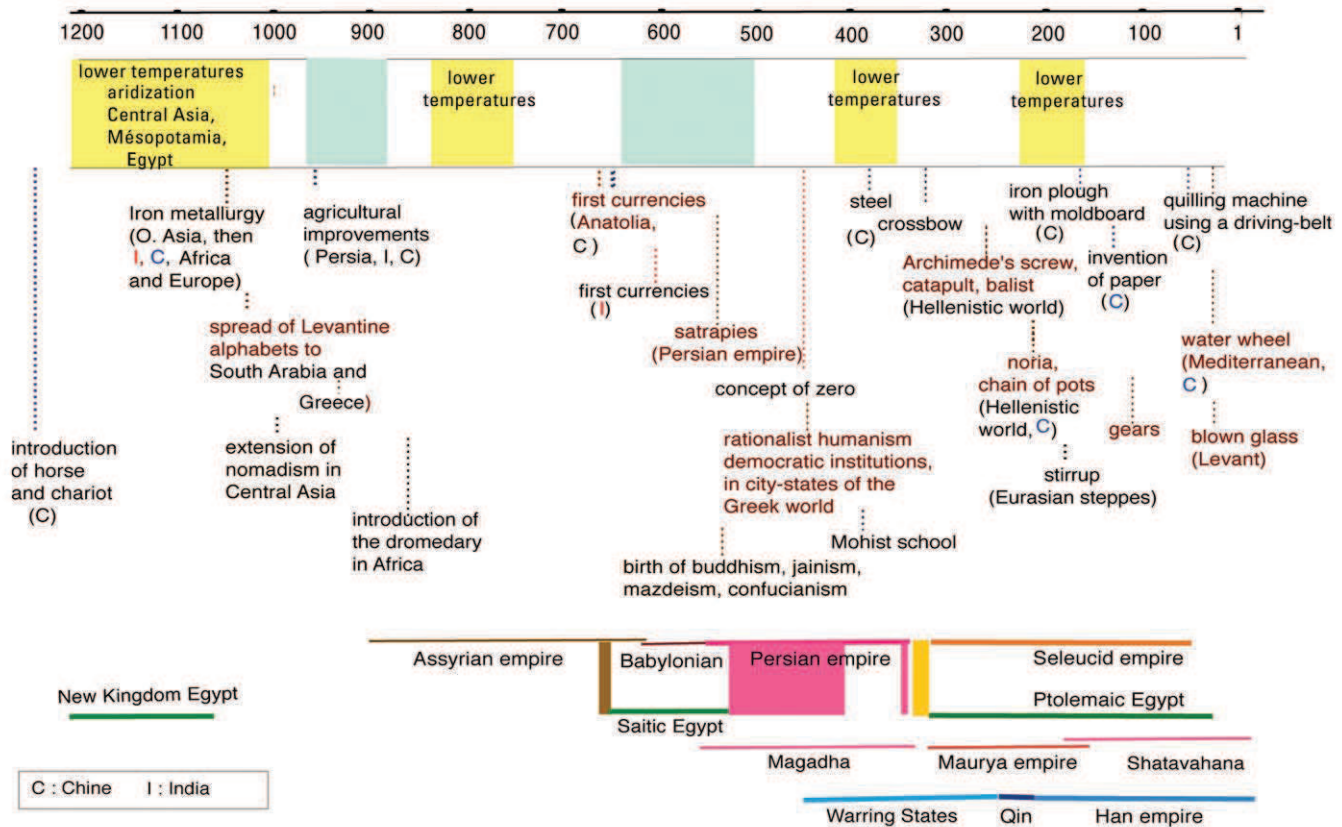


FIGURE 2. Iron Age: Climatic changes; technological, institutional, and ideological innovations; and political evolutions

guish three great cycles marked by hegemonic transition phenomena between the competing regions. The recessions partly stemmed from various-scale climatic deteriorations around 800, 400, and 200 B.C. (see Table 1).

The Indian world-system cycles that emerged around the seventh century B.C. are more difficult to determine, given that there are fewer data and considering the peculiarities of South Asia, a region that often shows a slight discrepancy with the rest of the system (Beaujard 2005). One can consider a possible union of this Indian system with the world-system encompassing western Asia, Africa, and Europe starting in 350 B.C. Yet the growing interaction of the Indian system with Southeast Asia and China, which started in 200 B.C., partly counterbalanced the withdrawal of the Western world-systems, for it seems that southern India was in a phase of expansion at that time.

The Eastern world-system centered on China developed in three cycles. The first two were clearly parallel to those of the Western world-system; this parallelism does not necessarily indicate a fusion of these two systems, but it does point to the possible influence of global climatic factors (variations in mean temperature) on the established cyclic logic (more studies, however, would be useful for dating more precisely the occurrence of the climatic changes as well as determining their impact on the different regions considered here, although it remains the case that these general trends are now well documented and persuasive vis-à-vis the global effect they might have had in the past). On the other hand, the third cycle seems to be quite different, as the Eastern world-system was growing until the mid first century B.C. The land and sea Silk Routes that were established at that time laid the foundations of what would follow; the developments in the second and the first centuries B.C. marked a decisive stage in the integration of the Mediterranean, Indian, and Chinese spheres, and in their interconnection. They announce the turn of the first century A.D., when the intensity of exchanges led to the interdependence of the different parts of what, from then on, would make up a single world-system ranging from eastern Asia to Western Europe and Africa.

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